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**Amendments to the Specification:**

Rewrite paragraph [0030] as follows.

[0030] Turning now to FIG. 2, there is a block diagram of a communication system of the present invention showing communication with mobile units with and without diversity. The exemplary configuration provides STTD for users 1 through Z and no diversity for users Z+1 through K. The communication system, therefore, provides STTD for data symbols on lead 202 as well as no diversity for data symbols on lead 218. Data symbols $D^1$ at lead 202 are STTD encoded by encoder circuit 200 to produce encoded data symbols $D_1^1$ on lead 204 and encoded data symbols $D_2^1$ on lead 206. Encoded data symbols $D_1^1$ on lead 204 are multiplied by a predetermined user specific code or sequence $C^1$ by circuit 208 and applied to summation circuit 212. Summation circuit 212 sums these encoded data symbols together with other user specific data symbols and applies them to antenna 1 at lead 230. Likewise, data symbols $D_2^1$ on lead 206 are multiplied by the same user specific code $C^1$ by circuit 214 and applied <u>via 210</u> to summation circuit 216. Summation circuit 216 sums these encoded data symbols together with other user specific data symbols and applies them to antenna 2 at lead 236. These summed symbols are transmitted over radio channel 261 to a mobile receiver antenna at lead 250. The transmitted symbols are effectively multiplied by channel impulse response matrices $H_1$ 232 and $H_2$ 238 on respective paths 234 and 240 and summed by path 242. Noise $N$ is added by path 246 to produce the received signal at antenna 250. A joint STTD decoder circuit 260 receives the composite signal and produces user specific symbol sequences $\hat{D}^1$ on lead 252, $\hat{D}^k$ on lead 254 and $\hat{D}^K$ on lead 256, corresponding respectively to K users.

Rewrite paragraph [0037] as follows.

[0037] The phase correction circuit receives a complex conjugate of a channel estimate of a Rayleigh fading parameter $\alpha_j^{1*}$ corresponding to the first antenna on ~~lead~~ leads 643 and 644 and a channel estimate of another Rayleigh fading parameter $\alpha_j^2$ corresponding to the second antenna on lead 646. Circuit 640 produces a product of signal $R_j^1$ and channel estimate $\alpha_j^{1*}$ at lead 662. Circuit 642 produces a product of signal $R_j^2$ and channel estimate $\alpha_j^{1*}$ at lead 658. Complex conjugates of the input signals are produced by circuits 636 and 638 at leads 648 and 650, respectively. Circuit 652 produces a product of the conjugate at lead 648 and channel estimate $\alpha_j^2$ at lead 656. Circuit 654 produces a product of the conjugate at lead 650 and channel estimate $\alpha_j^2$ at lead 664. Circuit 666 adds the signals at leads 662 and 664 and produces an average at lead 668. Circuit 660 subtracts the signal at lead 656 from the signal at lead 658 and produces an average at lead 670. ~~Complex conjugates of the input signals are produced by circuits 636 and 638 at leads 648 and 650, respectively.~~ These ~~input signals and their complex conjugates are multiplied by Rayleigh fading parameter estimate signals and summed as indicated to produce~~ averages are path-specific first and second symbol estimates at respective output leads 668 and 670 as in equations [3-4].

$$R_j^1\alpha_j^{1*} + R_j^{2*}\alpha_j^2 = (|\alpha_j^1|^2 + |\alpha_j^2|^2)S_1 \quad [3]$$

$$-R_j^{1*}\alpha_j^2 + R_j^2\alpha_j^{1*} = (|\alpha_j^1|^2 + |\alpha_j^2|^2)S_2 \quad [4]$$

Rewrite paragraph [0044] as follows.

[0044] These initial data symbols are STTD encoded and multiplied by the initial channel estimates stored in memory circuit 804 via 810 as shown in equations [11-12] for path $p$ and stored in circuit 814.

$$e_{1,p}^{(0)} = (a_{p,1}^{(0)} d_{1,1}^{(0)} - b_{p,1}^{(0)} d_{2,1}^{*(0)}, a_{p,2}^{(0)} d_{1,2}^{(0)} - b_{p,1}^{(0)} d_{2,2}^{*(0)}, \ldots, a_{p,K}^{(0)} d_{1,K}^{(0)} - b_{p,K}^{(0)} d_{2,K}^{*(0)})^T \qquad [11]$$

$$e_{2,p}^{(0)} = (a_{p,1}^{(0)} d_{2,1}^{(0)} + b_{p,1}^{(0)} d_{1,1}^{*(0)}, a_{p,2}^{(0)} d_{2,2}^{(0)} + b_{p,1}^{(0)} d_{1,2}^{*(0)}, \ldots, a_{p,K}^{(0)} d_{2,K}^{(0)} + b_{p,K}^{(0)} d_{1,K}^{*(0)})^T \qquad [12]$$

Rewrite paragraph [0045] as follows.

[0045] Circuit 814 multiplies these STTD encoded data symbols of equations [11-12] by cross correlation matrix $R$ from circuit 802 <u>via 808</u> to produce a signal estimate given by equation [13].

$$E = (e_{2,1}^{(-1)}, e_{2,2}^{(-1)}, \ldots, e_{2,L}^{(-1)}, e_{1,1}^{(0)} e_{1,2}^{(0)}, \ldots, e_{1,L}^{(0)}, e_{2,1}^{(0)}, e_{2,2}^{(0)}, \ldots, e_{2,L}^{(0)})^T \qquad [13]$$

Rewrite paragraph [0061] as follows.

[0061] The term $\Sigma$ is a diagonal matrix and $H$ is an upper triangular matrix. The Cholesky decomposition in equation [36] greatly reduces the calculation complexity of equation [35] by eliminating the term $(\tilde{A}^H \tilde{A})^{-1}$. The Cholesky formulation of equation [36] <u>is performed by circuits 910 and 912 (FIG. 9B) and</u> provides a means for solving equation [35] using a forward equation obtained from the upper triangular matrix H. <u>The Cholesky formulation is applied to circuit 914 via 916, where it is added to the feedback signal on 918. The output of circuit 914 is applied to threshold detector 922 via 920 to produce a next iteration of $\hat{\underline{D}}$ on 906.</u> The detailed block diagram of FIG. 9B illustrates the iterative solution to equation [34] of the zero forcing STTD equalizer with decision feedback. Derivation and use of the feedback operator 924 is explained in detail Anja Klein et al. at 280.

Rewrite paragraph [0062] as follows.

Referring now to FIG. 10A, there is a block diagram of a third embodiment of interference cancellation of the present invention with an STTD decoder <u>1002</u> and a minimum mean squared error STTD equalizer 1004 <u>to produce data symbol matrix $\hat{\underline{D}}$ at 1006</u>. For data

covariance matrix $\zeta_{\bar{D},\bar{D}}$, the minimum mean squared error solution for STTD decoding (MMSE-STTD) is given by equation [37].

$$\begin{bmatrix} \hat{\bar{D}} \\ \hat{\bar{D}}^{*} \end{bmatrix}_{MMSE-STTD} = \left(\tilde{A}^{H}\zeta_{\tilde{N},\tilde{N}}^{-1}\tilde{A}+\zeta_{\bar{D},\bar{D}}^{-1}\right)^{-1}\tilde{A}^{H}\zeta_{\tilde{N},\tilde{N}}^{-1}\tilde{R} \qquad [37]$$

Rewrite paragraph [0066] as follows.

[0066] The Cholesky decomposition in equation [39] reduces the complexity of equation [38]. This is highly advantageous due to the calculation complexity of the term $\left(\tilde{A}^{H}\tilde{A}+I\right)$. The Cholesky formulation of equation [39] <u>is performed by circuits 1010 and 1012 (FIG. 10B) and</u> provides a means for solving equation [38] using a forward equation obtained from the upper triangular matrix *H*. <u>The Cholesky formulation is applied to the sum circuit via 1016, where it is added to the feedback signal on 1018. The output of the sum circuit is applied to threshold detector 1022 via 1020 to produce a next iteration of</u> $\underline{\hat{\bar{D}}}$ <u>on 1006.</u> The block diagram of FIG. 10B shows an iterative minimum mean squared error STTD equalizer with decision feedback. Derivation and use of the feedback operator 1024 is explained in detail by Klein et al., *Id.* at 281.

Rewrite paragraph [0068] as follows.

[0068] Referring to FIG. 13A, there is a block diagram of a receiver of the present invention including STTD decoders before the rake receivers and joint detector. This circuit design is similar to that of FIG. 7. The circuit ~~provides~~ <u>applies a received signal on 1300 to</u> STTD decoder circuits 1302-1304 corresponding to respective multipath signals. Each STTD decoder produces plural output signals that are coupled to respective rake receivers <u>1306-1308</u> to combine multipath signals for each respective user. The combined signals are then applied to joint STTD detector circuit 1310. The joint detector circuit utilizes detected signals for other users to eliminate interference from the intended user signal as previously described. The circuit of FIG. 13B is an alternative embodiment of the present invention. This embodiment includes rake receivers 1312-1314 arranged to combine

multipath signals for each respective user. These combined signals are then applied to the combined joint detector and STTD decoder circuit 1316. The joint detector 1316 decodes the received signals for each user and subtracts interference signals for unintended users to produce the intended output signal $D_0$ on lead 1320. The circuit of FIG. 13C is yet another embodiment of the present invention. This embodiment includes rake receivers 1312-1314 as previously described. Combined signals from the rake receivers are applied to the joint detector circuit 1318 for user identification and interference cancellation. The resulting signal is applied to STTD decoder 1319. The STTD decoder produces decoded output signal $D_0$ on lead 1320 for the intended user.